

## Claims:

1. An addressable biologic electrode array comprising:  
an array of electrodes disposed on a support, the array of electrodes being selectively addressed and driven using a memory associated with each electrode of the array, the driven electrodes being driven at one of a plurality of stimulus levels by a source of electrical current or voltage external to the array.
2. The device of claim 1, further comprising a polymer layer disposed above the array of electrodes.
3. The device of claim 1, wherein the polymer layer is permeable to water.
4. The device of claim 1, wherein the polymer layer is permeable to counter-ions.
5. The device of claim 3, wherein the polymer layer is permeable to electrolysis reaction gases.
6. The device of claim 1, wherein the polymer layer has a thickness within the range of approximately 1 nanometer to approximately 100 microns.
7. The device of claim 1, further comprising a biomolecule coupled to the polymer layer.

8. The device of claim 7, wherein the biomolecule comprises nucleic acids.
9. The device of claim 7, wherein the biomolecule comprises amino acids.
10. The device of claim 1, wherein the stimulus level is an electrical current.
11. The device of claim 1, wherein the stimulus level is a voltage.
12. The device of claim 1, wherein the support is contained within a sample chamber.
13. The device of claim 1, further comprising a computer external to the array that is operatively coupled to the memory associated with each electrode, the computer controlling the stimulus level of the driven electrodes.
14. A method of selectively addressing and applying electrical current or voltage to electrodes in a biologic electrode array comprising the steps of:  
providing an array of electrodes on a substrate, the array of electrodes being selectively addressed and driven using a memory associated with each electrode of the array, the driven electrodes being driven at one of a plurality of stimulus levels by a source of electrical current or voltage external to the array.

15. The method according to claim 14, wherein a polymer layer is disposed above the array of electrodes.
16. The method according to claim 15, wherein the polymer layer is permeable to water.
17. The method according to claim 15, wherein the polymer layer is permeable to counter-ions.
18. The method according to claim 15, wherein the polymer layer is permeable to electrolysis reaction gases.
19. The method according to claim 15, wherein the polymer layer has a thickness within the range of approximately 1 nanometer to approximately 100 microns.
20. The method according to claim 15, further comprising a biomolecule coupled to the polymer layer.
21. The method according to claim 20, wherein the biomolecule comprises nucleic acids.
22. The method according to claim 20, wherein the biomolecule comprises amino acids.

23. The method according to claim 14, wherein the stimulus level is an electrical current.

24. The method according to claim 14, wherein the stimulus level is a voltage.

25. The method according to claim 14, further comprising the step of providing a computer external to the array that is operatively coupled to the memory associated with each electrode, the computer controlling the stimulus level of the driven electrodes.

26. The method according to claim 14, further comprising the step of imaging the array of electrodes.